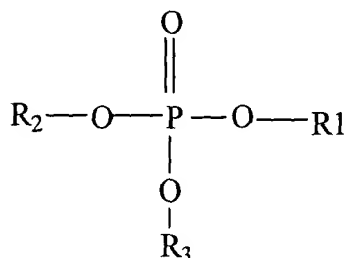


## CLAIMS

We claim:

- 5 ~~5. 1.~~ A wood composite material comprising:  
(i) an organophosphorus ester compound, and (ii) a polymer binder resin.
2. The wood composite material according to claim 1, wherein the organophosphorus ester has the formula:



15 and R<sub>1</sub>, R<sub>2</sub> and R<sub>3</sub> are independently either alkyl or aryl chains having hydroxyl, carboxylic or both hydroxyl and carboxylic functionality.

20 3. The wood composite material according to claim 1 wherein the at least one organophosphorus ester is at least one ester selected from the group consisting of diethyl-N, N-bis(2-hydroxyethyl) aminomethyl phosphate; dimethyl methyl phosphate; diethyl-N, N-bis(2-hydroxyethyl) aminoethyl phosphonate; dimethyl-N, N-bis(2-hydroxyethyl) aminomethyl phosphonate; dipropyl-N, N-bis(3-hydroxypropyl) aminoethyl phosphonate; and dimethyl-N, N-bis(4-hydroxybutyl) aminomethyl phosphonate.

4. The wood composite material according to claim 1, wherein the organophosphorus ester is at least one ester selected from the group consisting of diethyl-N, N-bis(2-hydroxyethyl) aminomethyl phosphate and dimethyl methyl phosphate.

25 5. The wood composite material according to claim 1 comprising from about 5 wt% to about 30 wt% of the organophosphorus ester compound.

6. The wood composite material according to claim 2 wherein said polymeric binder is selected from the group consisting of isocyanates, phenol-formaldehydes, and melamine urea formaldehyde.

7. The wood composite material according to claim 1 wherein the composite material comprises about 5 to about 30 wt % of the organophosphorus ester compound and about 3 to about 20 wt % of the polymeric binder.

8. The wood composite material according to claim 1 wherein the composite material comprises about 5 to about 10 wt % of the organophosphorus ester and about 3 to about 10 wt % of the polymeric binder.

9. The wood composite material according to claim 1, wherein the at least one organophosphorus ester forms cross-links between polymer chains of the at least one polymeric binder resin.

10 10. The wood composite material according to claim 1, wherein said composite material achieves a limiting oxygen index in the range of about 26 to about 40, an average thickness swelling in the range of about 7% to about 15 %, and said composite material has a fire spread rating of greater than about 25 and less than about 75.

11. The wood composite material according to claim 1, wherein the wood composite material is selected from the group consisting of plywood, particleboard, flakeboard, and oriented strand board.

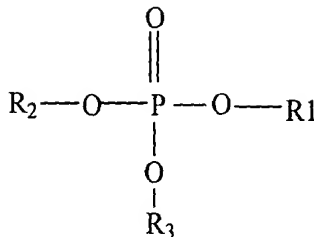
12. The wood composite material according to claim 1, wherein the wood composite material is selected from the group consisting of flakeboard and oriented strand board.

13. A process for preparing a fire retardant oriented strand board composite material comprising the steps of:

- (1) coating wood strands or flakes with at least one polymeric binder, wax, and at least one organophosphorus ester,
- (2) forming a mat of said coated wood strands or flakes, and
- (3) compressing said mat under heat and pressure to form an oriented strand board composite panel,

wherein upon compression the at least one organophosphorus ester forms cross-links between polymer chains of the at least one polymeric binder resin.

14. The process according to claim 13, wherein the organophosphorus ester has the formula:



wherein R<sub>1</sub>, R<sub>2</sub> and R<sub>3</sub> are independently either alkyl or aryl chains having hydroxyl, carboxylic or both hydroxyl and carboxylic functionality.

15. The process according to claim 14, wherein said polymeric binder selected from the group consisting of 4,4'-diphenylene methane diisocyanate; phenol formaldehyde and melaine urea formaldehyde.

16. The process according to claim 13, wherein the organophosphorus ester is at least one ester selected from the group consisting of diethyl-N, N-bis(2-hydroxyethyl) aminomethyl phosphate; dimethyl methyl phosphate; diethyl-N, N-bis(2-hydroxyethyl) aminoethyl phosphonate; dimethyl-N, N-bis(2-hydroxyethyl) aminomethyl phosphonate; dipropyl-N, N-bis(3-hydroxypropyl) aminoethyl phosphonate; and dimethyl-N, N-bis(4-hydroxybutyl) aminomethyl phosphonate.

17. The process according to claim 13, wherein the organophosphorus ester is at least one ester selected from the group consisting of diethyl-N, N-bis(2-hydroxyethyl) aminomethyl phosphate and dimethyl methyl phosphate.

18. The process according to claim 13, wherein the oriented strand board composite material comprises about 5 to about 30 wt % of the organophosphorus ester compound.

19. The process according to claim 13, wherein the oriented strand board composite material comprises about 5 to about 30 wt % of the organophosphorus ester and about 3 to about 20 wt % of the polymeric binder.

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Year	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100
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